UNIVERSITI TEKNIKAL MALAYSIA MELAKA

NOISE EXPOSURE LEVEL MONITORING IN A FURNITURE INDUSTRY

Thesis submitted in accordance with the requirements of Universiti Teknikal Malaysia Melaka for the Bachelor Degree of Manufacturing Engineering in Manufacturing Management

By

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This PSM submitted to the senate of Universiti Teknikal Malaysia Melaka (UTeM) and has been as partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Management). The member of the supervisory committee is:

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DECLARATION

I hereby, declared this thesis entitled “Noise Exposure Level Monitoring in a Furniture Industry” is the result of my own research except as cited in references.

Signature	:	……...
Author’s Name	:	Mohd Ikhwan Bin Ishak
Date	:	……...

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Mohd Ikhwan Bin Ishak

DEDICATION

For my adored parents:

Ishak Bin Mohammed

Sariah Binti Ismail

And for my respected brother and sisters:

Mohd Ikmal Bin Ishak

Mohd Ihsan Bin Ishak

Muhammad Iqbal Bin Ishak

ABSTRACT

This research is about the noise level monitoring in a furniture industry. Noise can be defined as unwanted sound which is very loud and irritating to out ears. This research begins with literature review taken from journals, books, articles, dictionaries, websites, electronic data bases and also previous study done. All of these resources will help to provide information about the previous study and give a clear view to determine the problem statement, objectives and scope of the study. In the methodology chapter, the general idea of the research flow will be explained. This research began with identifying the problem statement which includes the objectives and scope of the research. After that, literature review is done in order to gather information and determines the best step to complete the research. Data collections will be done using observations and measuring devices. All data gain in the data collection process will be analyzed using statistical method and measurement devices software. The final step is to propose recommendations and suggestions to help the company improve in the working area for their workers.

ABSTRAK

Kajian ini membincangkan tentang pemantauan bunyi bising di dalam bidang industri perabot. Bunyi bising boleh ditafsirkan sebagai bunyi yang terlalu kuat dan menyakitkan telinga. Kajian ini bermula dengan ulasan karya dari artikel-artikel, buku, jurnal, kamus, laman web, pengkalan data elektronik dan kajian sebelumnya. Semua sumber ini digunakan untuk mengumpul informasi terhadap kajian lepas dan memberi penjelasan terhadap pernyataan masalah, objektif dan skop kajian. Pengumpulan data dilakukan mengunakan kaedah soalan kaji seledik dan alat pengukuran. Data yang dikumpul akan di analisa mengunakan kaedah statistik dan perisian alat pengukuran. Langkah terakhir adalah mencadangkan langkah untuk memperbaiki keadaan syarikat berdasarkan konsep ergonomik.

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

ANSI	-	American National Standards Institute
FMA	-	Factory and Machinery
ISO	-	International Organization for Standardization
NIOSH	-	National Institute for Occupational Safety and Health
OSHA	-	Occupational Safety and Health Administration
PPE	-	Personal Protective Equipment
PSM	-	Projek Sarjana Muda
T	-	Ton
TWAN	-	Time Weighted Average Noise
UTeM	-	Universiti Teknikal Malaysia Melaka

CHAPTER 1
INTRODUCTION

1.1 Introduction

Nowadays ergonomics become one of the current goals to achieve in every fields or work. Many of us still did not realize the importance of ergonomics in their daily life. Ergonomics can be broken down into many components that affect our daily life. They usually involve the comfort of human whether in the working area, surrounding environment and also the posture of the human body. All of these components will become hazards to human if not corrected as soon as possible.

We do our work in the surrounding environment that we think are safe to be in. this is actually not correct because even in the controlled area, the environment can still be danger to human. In the ergonomics aspect, environment consists of the air we breathe, the temperature around us, the sound we hear and the visual we see. Out of these factors stated above, we only care about the air we breathe. If the air were polluted, then the environmental will become hazard to us. We did not know or care that other type of environmental factors that can cause danger to us.

One of the most common factors that always been ignore by the worker and employee is the sound occur when working. Sound can be separate into two categories which is normal sound that we hear every day and the other one is noise. Noise occurs when the sounds that we hear exceed the limit and the sound can hurt our ears. Most of us cannot differentiate between sound and noise because we always think that both of it is the same. That is why many people just ignore the noise around them and did not try to protect their ears.

Sound in the higher state called noise, can be very intimidating and disturbing our peacefulness. In the short term, the noise did not bring any side effect to us but in the long term it can possibly hurt our hearing system. The noise can cause human to loose their hearing ability that is very important in every day routine. Most of us did not even know that we have trouble hearing until we become old.

From the reasons above, a research will be done in the noise issues in the working areas at a furniture industry. Even though there were several researches done in the furniture industry, none of it was done under the environmental subject. The main goal of this research is to determine the noise condition in Teknion Malaysia. Noise is one of the common environmental issues but sometimes never been given serious attention by the employer.

1.2 Statement of Problem

Nowadays, there is not much research done in the furniture industry. Same as other major type of industries, furniture industry also facing the same environmental issues especially noise level exposure. On that reasons, the study will be conduct in furniture industry under noise monitoring for worker in furniture industry.

1.3 Objectives

The objectives of this research are:

1. To determine the noise level in selected furniture industry.
2. To collect data, make a comparison and analysis on noise level by referring to OSHA standard or Factories and machinery act.
3. To give recommendation for the improvement on working condition of people in the factory.

1.4 Scope

This research will be done only in Teknion Furniture System (M) Sdn Bhd. The focus of this research is the noise level occurs in the critical section of the factory. A self observation will be done in Manufacturing B section. The equipment that will be used in this research is Extech Digital Sound Level Meter Model 407730. This equipment is provided by UTeM Ergonomic Laboratory.

1.4 Company Background

In year 1995, Teknion furniture system Malaysia was set up in Tangkak, Johor. The first manufacturing was commencing with 16 employees in 35,000 square feet of manufacturing floor. The earliest product were manufactured in Malaysia is T.O.S products.

When the age of Teknion reach four years old, the company shift their factory in Klang, Selangor. The new factory was built on 180,000 square feet of ground which give the company better space of manufacturing. With the new facilities, Teknion Malaysia introduced three more new products ranging from seating, filling and storage product. The new facilities give better production lines which extend the capabilities of Teknion in Asia, Middle East and in India. The brisk improvement in Teknion Malaysia is a part of the prime growth in Teknion history.

Teknion furniture system does not only manufacture furniture, they also strive to understand the problems in work place. With the company motto "**DESIGN DOES MATTER**", they challenge themselves to come up with new and the best solution for work place problems. Customer's satisfactions were one of their goals to achieve every year.

They have five major missions to archive which is to expand Teknion market coverage within the Asia Pacific Rim to achieve a turnover of RM500 million (C$200 Million). Second, increase Teknion technology driven manufacturing capacity with 700,000 sq. ft of manufacturing space. Third, introduce new quality products offerings adaptable to regional demands. Fourth, be committed to increase our workforce to 800 personnel managed by quality Human Resources Development programmes. The fifth mission is continued to ensure Teknion Malaysia is known as a caring organization and is recognized for excellence in quality, growth and profitability.

Teknion Vision stated that they shall be the total office solutions provider with world class products and services that enrich the quality of life.

"We strive to consistently provide product and service which exceed our customer expectations!" is Teknion quality statement.

Teknion general information:

Company Name	Teknion Furniture System (M) Sdn Bhd
Location	Lot 761, Jalan Haji Sirat, Off Jalan Meru, 42100 Klang, Selangor Darul Ehsan, Malaysia.
Telephone/Fax	603-3342 4345 / 603-3343 5100
Website	http://www.teknion.com
activities	-Teknion Furniture System (M) Sdn Bhd is one of the Teknion branch. The main headquarter is in Toronto, Canada and the company is listed on the Toronto Stock Exchange (TSE) using the symbol TKN. -First plant was established in Tangkak, Johor in 1995. Starting with 16 employees producing components for T/O/S line of office furniture in 35000swuare feet of manufacturing space. -In 1999, Teknion Malaysia acquired a leading Malaysian Manufacturer of filling, storage and seating products. Included in the acquisition was a 180,000 square foot facilities in Klang. This significantly helps Teknion improved their manufacturing capabilities in Asia for distribution in Asia, Middle East and India. -Teknion does more than manufacture furniture. They strive to understand the needs and challenges of the workplace and design the real solution that will meet those needs today and in the future. -Teknion's key to continue success is to focus on understanding the real challenges of the working world. Teknion will continue to design, manufacture and deliver the highest quality office solutions by listening to the people they work with.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In this chapter, several literatures will be review regarding the title of the project. All aspects and subject involved within the project scope will be highlighted. There are three main fields that involved in this chapter which are Ergonomics, environmental and Furniture Industry. There were many journal and book referring to the project scope. From the broad area, the review then highlighted a main issue which is noise level. Literature review works as a guideline and better understanding to the field of project. It helps to identify the current problems, information, new techniques, and method of study, solution and recommendation.

2.2 Ergonomics Characterization

Ergonomics was first defined as the scientific study of the relationship between man and his environment by Murrell, 1950. Nowadays, ergonomics was defined as a study of work and its environment and conditions in order to achieve maximum efficiency (Hawkins et al. 1998). For engineering purpose, ergonomics known as a multidisciplinary science that seeks to conform the workplace and all of it physiological aspect to the worker. Ergonomics involves the following criteria: using special design and evaluation techniques to make task, objects, and environments more compatible with human abilities and limitation. The second criterion is seeking to improve productivity and quality by reducing workplace stressor, reducing the risk of injuries and illnesses and increasing efficiency (Goetsch, 2005).

Ergonomics can be divided into three categories. The first category is physical ergonomics which involved with human anatomical, anthropometric, physiological and biomechanical. The second category is cognitive ergonomics which concern about mental process. The third category is organizational ergonomics that optimize the sociotechnical system including organizational structures policies and process.

2.2.1 Ergonomics History

In 1857, Jastrzebowski produced a philosophical treatise on 'An Outline of Ergonomics or the Science of Work' but it seems to have remained unknown outside Poland, until recently. In Britain, the field of ergonomics was inaugurated after the Second World War. The name was re-invented by Murrell in 1949 despite the objections that people will confuse it with economics (Bridger, 2003).

Christensen (1987) points out that the importance of a "good fit" between humans and tool was realized early in the development of species. The early species called Australopithecus Prometheus used pebble tools and antelope bones to made scoops to make their tasks easier. Nowadays, the selection or creating tools, machines, and work process is still continued. *The birth of machines such as the spinning jenny (a machine that produced yarn to make cloth) and rolling mills (a method of flattening iron ore into flat sheets) in the Industrial Revolution era were made to improve the work process. This type of improvement is the common motivation of ergonomics today* (http://www.ergoweb.com/resources/faq/history.cfm).

In the late 19th century, Frederick W. Taylor finished several studies in ergonomics. When the studies were finished, it gives the Business area a strong base of understanding which clearly define the current outlook on work. Frederick's studies were recognize in the Business are and he was name the father of Scientific Management. Mainly, Taylor was interested in a scientific management which is to improve the working condition for the middle class by leveling a large scale changes in manufacturing process. From the help of his group and self motivation, he came up with the studies and completed it.

Scientific Management, developed by F. W. Taylor, and workstudy, developed by the Gilbreths, is precursors of ergonomics (Bridger, 2003). Both of Taylor and Gilbreths came up at the early of 20th century. They were focusing the awareness of improving productivity by changing the way of work done. In that time, many company hired a foremen to arrange their factory plant. This decision was decided by the foremen and did not involve the owner. It's the foremen job to arrange the machine and work station the best that they could come up. The manager's only concern about the output of the factory produced but did not give any attention to the working condition. The worker will get incentives for improvement suggested and the income we hang on the foremen that arrange the work.

Taylor did not agree with the trend because it will lead to corruption and exploitation of worker. Taylor emphasis that every job, no matter how small, was worthy of study and improvement (Bridger, 2003). Taylor stress out that the management team is responsible for what action to take in order to maximizing the return profits, for top and lower management including worker. In every task, it should be broken down into simplest form, given a brief explanation would help worker maximize their output productivity.

In the 1920s and early 1930s a series of experiments were carried out over 12 years by Elton Mayo and his colleagues at the Hawthrone Works of the Western Electric Company in the USA (Bridger, 2003). Their experiments were historical for the social factors at work. The investor began by examining the effect of illumination, rest pauses and shorter hours on productivity and fatigue but soon ran into difficulties because they were

Trying to maintain a controlled experiment in which they could test for the effect of single variables while holding all other factors constant... By Period XIII it had become evident than in human situations, not only was practically impossible to keep all other factors constant but trying to do so in itself introduced the biggest change of all; in other words the investigators had not been studying an ordinary shop situation but a socially contrived situation of their own making (Rothlisberger and Dickson, 1939)

(Bridger, 2003)